Claims

1. A positive electrode active material containing a compound represented by the general formula $Li_xM_yPO_4$, where $0 < x \leq 2$ and $0.8 \leq y \leq 1.2$, with M containing a 3d transition metal,

where said $Li_xM_yPO_4$ encompasses that with the grain size not larger than 10 μm.

2. The positive electrode active material according to claim 1 wherein said $Li_xM_yPO_4$ has a 10% cumulative volumetric size not larger than 1 μm.

3. The positive electrode active material according to claim 1 wherein said $Li_xM_yPO_4$ has a BET specific surface area of not less than 0.5 m^2/g.

4. The positive electrode active material according to claim 1 wherein said $Li_xM_yPO_4$ is $LiFePO_4$.

5. A positive electrode active material containing a compound represented by the general formula $Li_x(Fe_yM_{1-y})PO_4$, where $0.9 \leq x \leq 1.1$ and $0 < y \leq 1$, with M containing a 3d transition metal,

wherein, in a spectrum for said $Li_x(Fe_yM_{1-y})PO_4$ obtained by the Moessbauer spectroscopic method, A/B is less than 0.3, where A is the area strength of a spectrum obtained by the Moessbauer spectroscopic method of not less than 0.1 mm/sec and not larger than 0.7 mm/sec and B is the area strength of a spectrum obtained by the Moessbauer spectroscopic method not less than 0.8 mm/sec and not larger than 1.5 mm/sec.

6. The positive electrode active material according to claim 5 wherein said is $Li_x(Fe_yM_{1-y})PO_4$ is $LiFePO_4$.

7. A non-aqueous electrolyte secondary battery comprising a positive electrode having a positive electrode active material containing a compound represented by the general formula $Li_xM_yPO_4$, where $0 < x \leq 2$ and $0.8 \leq y \leq 1.2$, with M containing a 3d transition metal, a negative electrode having a negative electrode active material, said positive electrode active material and the negative electrode active material being capable of reversibly doping/undoping lithium, and a non-aqueous electrolyte,

wherein said $Li_xM_yPO_4$ encompasses that with the grain size not larger than 10 μm.

8. The non-aqueous electrolyte secondary battery according to claim 7 wherein said $Li_xM_yPO_4$ has a 10% cumulative volumetric size not larger than 1 μm.

9. The non-aqueous electrolyte secondary battery according to claim 7 wherein said $Li_xM_yPO_4$ has a BET specific surface area of not less than 0.5 m^2/g.

10. The non-aqueous electrolyte secondary battery according to claim 7 wherein said $Li_xM_yPO_4$.

11. A non-aqueous electrolyte secondary battery comprising a positive electrode having a positive electrode active material containing a compound represented by the general formula $Li_x(Fe_yM_{1-y})PO_4$, where $0.9 \leq x \leq 1.1$ and $0 < y \leq 1$, with M containing a 3d transition metal, a negative electrode having a negative electrode active material, said positive electrode active material and the negative electrode

active material being capable of reversibly doping/undoping lithium, and a non-aqueous electrolyte,

wherein, in a spectrum for said $Li_x(Fe_yM_{1-y})PO_4$ obtained by the Moessbauer spectroscopic method, A/B, A/B is less than 0.3, where A is the area strength of a spectrum obtained by the Moessbauer spectroscopic method not less than 0.1 mm/sec and not larger than 0.7 mm/sec and B is the area strength of a spectrum obtained by the Moessbauer spectroscopic method not less than 0.8 mm/sec and not larger than 1.5 mm/sec.

12. The non-aqueous electrolyte secondary battery according to claim 11 wherein said $Li_x(Fe_yM_{1-y})PO_4$ is $LiFePO_4$.

13. A method for producing a positive electrode active material comprising:

a mixing step of mixing a starting materials for synthesis of a compound represented by the general formula $Li_xM_yPO_4$, where $0 < x \leq 2$ and $0.8 \leq y \leq 1.2$, with M containing a 3d transition metal; and

a sintering step of sintering and reacting said precursor obtained in said mixing step;

wherein, in said sintering step, said precursor is sintered at a temperature not lower than 400°C and not higher than 700°C.

14. The method for producing a positive electrode active material according to claim 13 wherein, in said sintering step, said precursor is sintered at a temperature not lower than 400°C and not higher than 600°C.

15. The method for producing a positive electrode active material according to claim 13 wherein said $Li_xM_yPO_4$ is $LiFePO_4$.